

SEQUENCE LISTING

<110> GUSS, Bengt et al.
 <120> IMMUNIZATION OF NON-HUMAN MAMMALS AGAINST STREPTOCOCCUS EQUI
 <130> 0825-0173PUS2
 <140> US 10/530,879
 <141> 2005-04-11
 <150> PCT/SE2003/001587
 <151> 2003-10-10
 <160> 28
 <170> PatentIn version 3.1
 <210> 1
 <211> 180
 <212> PRT
 <213> Streptococcus equi
 <400> 1

Met Ala Leu Asp Ala Thr Thr Val Leu Glu Pro Thr Thr Ala Phe Ile
 1 5 10 15

Arg Glu Ala Val Arg Glu Ile Asn Gln Leu Ser Asp Asp Tyr Ala Asp
 20 25 30

Asn Gln Glu Leu Gln Ala Val Leu Ala Asn Ala Gly Val Glu Ala Leu
 35 40 45

Ala Ala Asp Thr Val Asp Gln Ala Lys Ala Ala Leu Asp Lys Ala Lys
 50 55 60

Ala Ala Val Ala Gly Val Gln Leu Asp Glu Ala Arg Arg Glu Ala Tyr
 65 70 75 80

Arg Thr Ile Asn Ala Leu Ser Asp Gln His Lys Ser Asp Gln Lys Val
 85 90 95

Gln Leu Ala Leu Val Ala Ala Ala Ala Lys Val Ala Asp Ala Ala Ser
 100 105 110

Val Asp Gln Val Asn Ala Ala Ile Asn Asp Ala His Thr Ala Ile Ala
 115 120 125

Asp Ile Thr Gly Ala Ala Leu Leu Glu Ala Lys Glu Ala Ala Ile Asn
 130 135 140

Glu Leu Lys Gln Tyr Gly Ile Ser Asp Tyr Tyr Val Thr Leu Ile Asn
 145 150 155 160

Lys Ala Lys Thr Val Glu Gly Val Asn Ala Leu Lys Ala Lys Ile Leu
 165 170 175

Ser Ala Leu Pro
 180

<210> 2
 <211> 597
 <212> PRT
 <213> Streptococcus equi

<400> 2

Met Lys Thr Lys Ser Phe Arg Lys Val Leu Thr Thr Ser Ala Thr Cys
 1 5 10 15

Ile Val Leu Ala Thr Ser Phe Ala Gly Gly Thr Leu Arg Val Trp Ala
 20 25 30

Glu Gln Leu Tyr Tyr Gly Trp Asn Asp Gly Thr Arg Gln Ser Ser Pro
 35 40 45

Tyr Phe Leu Tyr Val Ser Pro Lys Asn Ala Pro Lys Arg Glu Leu Lys
 50 55 60

Asp Glu Tyr Val Val Tyr Cys Phe Asn Lys Lys Leu Tyr Trp Pro Asp
 65 70 75 80

Gln Trp Glu Ser Ile Tyr Ser Asn Phe Asn Asp Ile Arg Ser Pro Tyr
 85 90 95

Asn Asp Leu Pro Val Tyr Glu Lys Lys Leu Gly Tyr Asp Gly Ile Phe
 100 105 110

Lys Gln Tyr Ala Pro Asp Tyr Lys Lys Asp Ile Ser Asp Ile Ala Ser
 115 120 125

Ala Leu Val Ala Val Leu Ser Asn Gly Tyr Pro Thr Asn Lys Ser Gln
 130 135 140

Leu Ser Thr Ser Tyr His Leu Asn Asn Asp Ser Ser Arg Lys Val Thr
 145 150 155 160

Gln Leu Ala Ile Trp Tyr Phe Ser Asp Ser Leu Thr Lys Glu Tyr Leu
 165 170 175

Lys Asp Thr Gly Gly Tyr Asn Leu Asn Asp Met Glu Lys Lys Ala Leu
 180 185 190

Asp Phe Leu Ile Ser Lys Gly Glu Asp Ser Lys Leu Lys Ser Glu Gln
 195 200 205

Ser Asn Tyr Ser Leu Asp Ile Tyr Val Tyr Gln Ser Gly Gly His Asp
 210 215 220

His Met Lys Asp Tyr Gln Asn Leu Leu Gly Ser Thr Leu Ile Pro Lys
 225 230 235 240

Glu Pro Leu Lys Pro Gln Leu Gly Gly Phe Ser Gly His Asn Gly Asn
 245 250 255

Gly Leu Ser Gly Leu Glu Gly Gly Ser Ser Gly Ser Gln Glu Thr Asn
 260 265 270

Glu Asp Gly Lys Lys Gly Leu Ile Gly Phe His Gly Gly Leu Ser Gly
 275 280 285

Ser Glu Gly Lys Arg Asp Pro Leu Pro Gly Leu Lys Gly Glu Ala Gly
 290 295 300

Ala Pro Asp Thr Pro Gln Lys Pro Asn Asp Pro Leu Gln Gly Leu Glu
 305 310 315 320

Gly Gly Asn Ser Pro Ile Val Glu Gln Asn Tyr Gly Ser Thr Glu Gly
 325 330 335

Tyr His Gly Gln Ser Gly Ile Leu Glu Glu Thr Glu Asp Thr Asn Pro
 340 345 350

Pro Gly Ile Ile Leu Gly Gly Ser Gly Asn Val Glu Thr His Glu Asp

355		360		365
Thr Arg Asn Pro His Leu Met Gly Ile Gly Gly Gly Leu Ala Gly Glu				
370		375		380
Ser Gly Glu Thr Thr Pro Lys Pro Gly Gln Thr Gly Gly Gln Gly Pro				
385		390		400
Val Ile Glu Thr Thr Glu Asp Thr Gln Lys Gly Met Ser Gly Gln Ser				
	405		410	415
Gly Gly Thr Ile Glu Ser Glu Asn Thr Lys Lys Pro Glu Val Met Ile				
	420		425	430
Gly Gly Gln Gly Gln Thr Ile Glu Thr Thr Glu Asp Thr Gln Lys Gly				
	435		440	445
Met Ser Gly Gln Ser Gly Gly Thr Ile Glu Ser Glu Asp Thr Lys Lys				
	450		455	460
Pro Glu Val Met Ile Gly Gly Gln Gly Gln Ile Ile Asp Phe Ser Glu				
465		470		480
Asn Thr Gln Ser Gly Met Ser Gly Gln Ser Gly Asp Thr Thr Val Ile				
	485		490	495
Glu Asp Thr Lys Lys Ser Glu Ile Ile Ile Gly Gly Gln Gly Gln Ile				
	500		505	510
Ile Asp Phe Ser Glu Asp Thr Gln Pro Gly Met Ser Gly Gln Ser Gly				
	515		520	525
Gly Thr Thr Ile Val Glu Asp Thr Lys Lys Pro Thr Pro Lys Pro Lys				
	530		535	540
Pro Ala Pro Ala Pro Ile Val Asn Asp Glu Lys Pro Asn Lys Gly Thr				
545		550		560
His Leu Pro Gln Thr Ser Asp Met Lys Gln Leu Thr Leu Ser Ile Ile				
	565		570	575
Gly Ala Met Ser Met Leu Leu Val Leu Cys Leu Ser Leu Phe Lys Arg				
	580		585	590

Pro Ser Lys Lys Asp
595

<210> 3
<211> 371
<212> PRT
<213> Streptococcus equi

<400> 3

Met Arg Lys Thr Glu Gly Arg Phe Arg Thr Trp Lys Ser Lys Lys Gln
1 5 10 15

Trp Leu Phe Ala Gly Ala Val Val Thr Ser Leu Leu Leu Gly Ala Ala
20 25 30

Leu Val Phe Gly Gly Leu Leu Gly Ser Leu Gly Gly Ser Ser His Gln
35 40 45

Ala Arg Pro Lys Glu Gln Pro Val Ser Ser Ile Gly Asp Asp Asp Lys
50 55 60

Ser His Lys Ser Ser Ser Asp Ser Met Val Ser Arg Pro Pro Lys Lys
65 70 75 80

Asp Asn Leu Gln Pro Lys Pro Ser Asp Gln Pro Thr Asn His Gln His
85 90 95

Gln Ala Thr Ser Pro Ser Gln Pro Thr Ala Lys Ser Ser Gly His His
100 105 110

Gly Asn Gln Pro Gln Ser Leu Ser Val Asn Ser Gln Gly Asn Ser Ser
115 120 125

Gly Gln Ala Ser Glu Pro Gln Ala Ile Pro Asn Gln Gly Pro Ser Gln
130 135 140

Pro Leu Gly Leu Arg Gly Gly Asn Ser Ser Gly Ser Gly His His His
145 150 155 160

Gln Pro Gln Gly Lys Pro Gln His Leu Asp Leu Gly Lys Asp Asn Ser
165 170 175

Ser Pro Gln Pro Gln Pro Lys Pro Gln Gly Asn Ser Pro Lys Leu Pro
180 185 190

Glu Lys Gly Leu Asn Gly Glu Asn Gln Lys Glu Pro Glu Gln Gly Glu
195 200 205

Arg Gly Glu Ala Gly Pro Pro Leu Ser Gly Leu Ser Gly Asn Asn Gln
210 215 220

Gly Arg Pro Ser Leu Pro Gly Leu Asn Gly Glu Asn Gln Lys Glu Pro
225 230 235 240

Glu Gln Gly Glu Arg Gly Glu Ala Gly Pro Pro Ser Thr Pro Asn Leu
245 250 255

Glu Gly Asn Asn Arg Lys Asn Pro Leu Lys Gly Leu Asp Gly Glu Asn
260 265 270

Lys Pro Lys Glu Asp Leu Asp Gly Lys Gly Leu Ser Gly Glu Asn Asp
275 280 285

Glu Ser Pro Lys Leu Lys Asp Glu His Pro Tyr Asn His Gly Arg Arg
290 295 300

Asp Gly Tyr Arg Val Gly Tyr Glu Asp Gly Tyr Gly Gly Lys Lys His
305 310 315 320

Lys Gly Asp Tyr Pro Lys Arg Phe Asp Glu Ser Ser Pro Lys Glu Tyr
325 330 335

Asn Asp Tyr Ser Gln Gly Tyr Asn Asp Asn Tyr Gly Asn Gly Tyr Leu
340 345 350

Asp Gly Leu Ala Asp Arg Gly Gly Lys Arg Gly Tyr Gly Tyr Ser Tyr
355 360 365

Asn Pro Asp
370

<210> 4
<211> 657
<212> PRT
<213> Streptococcus equi

<400> 4

Leu Lys Gln Leu Thr Lys Ile Val Ser Val Val Leu Leu Leu Val Phe
1 5 10 15

Thr Leu Ser Ala Ser Leu His Lys Val Arg Ala Thr Asn Leu Ser Asp
20 25 30

Asn Ile Thr Ser Leu Thr Val Ala Ser Ser Ser Leu Arg Asp Gly Glu
35 40 45

Arg Thr Thr Val Lys Val Ala Phe Asp Asp Lys Lys Gln Lys Ile Lys
50 55 60

Ala Gly Asp Thr Ile Glu Val Thr Trp Pro Thr Ser Gly Asn Val Tyr
65 70 75 80

Ile Gln Gly Phe Asn Lys Thr Ile Pro Leu Asn Ile Arg Gly Val Asp
85 90 95

Val Gly Thr Leu Glu Val Thr Leu Asp Lys Ala Val Phe Thr Phe Asn
100 105 110

Gln Asn Ile Glu Thr Met His Asp Val Ser Gly Trp Gly Glu Phe Asp
115 120 125

Ile Thr Val Arg Asn Val Thr Gln Thr Thr Ala Glu Thr Ser Gly Thr
130 135 140

Thr Thr Val Lys Val Gly Asn Arg Thr Ala Thr Ile Thr Val Thr Lys
145 150 155 160

Pro Glu Ala Gly Thr Gly Thr Ser Ser Phe Tyr Tyr Lys Thr Gly Asp
165 170 175

Met Gln Pro Asn Asp Thr Glu Arg Val Arg Trp Phe Leu Leu Ile Asn
180 185 190

Asn Asn Lys Glu Trp Val Ala Asn Thr Val Thr Val Glu Asp Asp Ile
195 200 205

Gln Gly Gly Gln Thr Leu Asp Met Ser Ser Phe Asp Ile Thr Val Ser
210 215 220

Gly Tyr Arg Asn Glu Arg Phe Val Gly Glu Asn Ala Leu Thr Glu Phe
 225 230 235 240

His Thr Thr Phe Pro Asn Ser Val Ile Thr Ala Thr Asp Asn His Ile
 245 250 255

Ser Val Arg Leu Asp Gln Tyr Asp Ala Ser Gln Asn Thr Val Asn Ile
 260 265 270

Ala Tyr Lys Thr Lys Ile Thr Asp Phe Asp Gln Lys Glu Phe Ala Asn
 275 280 285

Asn Ser Lys Ile Trp Tyr Gln Ile Leu Tyr Lys Asp Gln Val Ser Gly
 290 295 300

Gln Glu Ser Asn His Gln Val Ala Asn Ile Asn Ala Asn Gly Gly Val
 305 310 315 320

Asp Gly Ser Arg Tyr Thr Ser Phe Thr Val Lys Lys Ile Trp Asn Asp
 325 330 335

Lys Glu Asn Gln Asp Gly Lys Arg Pro Lys Thr Ile Thr Val Gln Leu
 340 345 350

Tyr Ala Asn Asp Gln Lys Val Asn Asp Lys Thr Ile Glu Leu Ser Asp
 355 360 365

Thr Asn Ser Trp Gln Ala Ser Phe Gly Lys Leu Asp Lys Tyr Asp Ser
 370 375 380

Gln Asn Gln Lys Ile Thr Tyr Ser Val Lys Glu Val Met Val Pro Val
 385 390 395 400

Gly Tyr Gln Ser Gln Val Glu Gly Asp Ser Gly Val Gly Phe Thr Ile
 405 410 415

Thr Asn Thr Tyr Thr Pro Glu Val Ile Ser Ile Thr Gly Gln Lys Thr
 420 425 430

Trp Asp Asp Arg Glu Asn Gln Asp Gly Lys Arg Pro Lys Glu Ile Thr
 435 440 445

Val Arg Leu Leu Ala Asn Asp Ala Ala Thr Asp Lys Val Ala Thr Ala
450 455 460

Ser Glu Gln Thr Gly Trp Lys Tyr Thr Phe Thr Asn Leu Pro Lys Tyr
465 470 475 480

Lys Asp Gly Lys Gln Ile Thr Tyr Thr Ile Gln Glu Asp Pro Val Ala
485 490 495

Asp Tyr Thr Thr Thr Ile Gln Gly Phe Asp Ile Thr Asn His His Glu
500 505 510

Val Ala Leu Thr Ser Leu Lys Val Ile Lys Val Trp Asn Asp Lys Asp
515 520 525

Asp Tyr Tyr His Lys Arg Pro Lys Glu Ile Thr Ile Leu Leu Lys Ala
530 535 540

Asp Gly Lys Val Ile Arg Glu His Gln Met Thr Pro Asp Gln Gln Gly
545 550 555 560

Lys Trp Glu Tyr Thr Phe Asp Gln Leu Pro Val Tyr Gln Thr Gly Lys
565 570 575

Lys Ile Ser Tyr Ser Ile Glu Glu Lys Gln Val Ala Gly Tyr Gln Ala
580 585 590

Pro Val Tyr Glu Val Asp Glu Gly Leu Lys Gln Val Thr Val Thr Asn
595 600 605

Thr Leu Asn Pro Ser Tyr Lys Leu Pro Asp Thr Gly Gly Gln Gly Val
610 615 620

Lys Trp Tyr Leu Leu Ile Gly Gly Gly Phe Ile Ile Val Ala Ile Leu
625 630 635 640

Val Leu Ile Ser Leu Tyr Gln Lys His Lys Arg His Asn Met Ser Lys
645 650 655

Pro

<210> 5.

<211> 34
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> OZAG43B primer used to PCR-amplify a DNA-fragment corresponding to amino acid residues 34-262 in protein EAG

 <400> 5
 ttttctcgag ctacggtaga gctgataaaa tctc 34

 <210> 6
 <211> 32
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> OZAG15 primer used to PCR-amplify a DNA-fragment corresponding to amino acid residues 34-262 in protein EAG

 <400> 6
 tcagccatgg ctctagatgc tacaacgggtg tt 32

 <210> 7
 <211> 600
 <212> DNA
 <213> Streptococcus equi

 <400> 7
 aaataat ttt gtttaact ttt aagaaggaga tataaccatg gctctagatg ctacaacgggt 60
 gtttagagcct acaacagcct tcattagaga agctgttagg gaaatcaatc agctgagtga 120
 tgactacgct gacaatcaag agcttcaggc tgttcttgct aatgctggag ttgaggcact 180
 tgctgcagat actgttgatc aggctaaagc agctcttgac aaagcaaagg cagctgttgc 240
 tgggtgttcag cttgatgaag caagacgtga ggcttacaga acaatcaatg ccttaagtga 300
 tcagcacaaa agcgatcaaa aggttcagct agctctagtt gctgcagcag ctaagggtggc 360
 agatgctgct tcagttgatc aagtgaatgc agccattaat gatgctcata cagctattgc 420
 ggacattaca ggagcagcct tgttggaggc taaagaagct gctatcaatg aactaaagca 480
 gtatggcatt agtgattact atgtgacctt aatcaacaaa gccaaaactg ttgaagggtgt 540
 caatgcgctt aaggcaaaga ttttatcagc tctacogtag ctcgagcccg ggtgctttgc 600

 <210> 8
 <211> 30
 <212> DNA
 <213> Artificial Sequence

<220>

<223> OSFS25 primer used to PCR amplify the 3' end of the sfs gene

<400> 8

ggtcccatgg caactccgaa tttagaagga

30

<210> 9

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> OSFS23 primer used to PCR amplify the 3' end of the sfs gene

<400> 9

cagactcgag gtcgggattg taagaatag

29

<210> 10

<211> 125

<212> PRT

<213> Streptococcus equi

<400> 10

Met Ala Thr Pro Asn Leu Glu Gly Asn Asn Arg Lys Asn Pro Leu Lys
1 5 10 15

Gly Leu Asp Gly Glu Asn Lys Pro Lys Glu Asp Leu Asp Gly Lys Gly
20 25 30

Leu Ser Gly Glu Asn Asp Glu Ser Pro Lys Leu Lys Asp Glu His Pro
35 40 45

Tyr Asn His Gly Arg Arg Asp Gly Tyr Arg Val Gly Tyr Glu Asp Gly
50 55 60

Tyr Gly Gly Lys Lys His Lys Gly Asp Tyr Pro Lys Arg Phe Asp Glu
65 70 75 80

Ser Ser Pro Lys Glu Tyr Asn Asp Tyr Ser Gln Gly Tyr Asn Asp Asn
85 90 95

Tyr Gly Asn Gly Tyr Leu Asp Gly Leu Ala Asp Arg Gly Gly Lys Arg
100 105 110

Gly Tyr Gly Tyr Ser Tyr Asn Pro Asp Leu Glu Pro Gly
115 120 125

<210> 11
 <211> 34
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Forward primer OFNZ1 used to construct the clone pT2fnzN

<400> 11
 accatggcta gcgcagagca gctttattat gggt 34

<210> 12
 <211> 32
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Reverse primer OFNZ2 used to construct the clone pT2fnzN

<400> 12
 ataccggga tacccttcgg tactaccata gt 32

<210> 13
 <211> 310
 <212> PRT
 <213> Streptococcus equi

<400> 13

Met Ala Ser Ala Glu Gln Leu Tyr Tyr Gly Trp Asn Asp Gly Thr Arg
 1 5 10 15

Gln Ser Ser Pro Tyr Phe Leu Tyr Val Ser Pro Lys Asn Ala Pro Lys
 20 25 30

Arg Glu Leu Lys Asp Glu Tyr Val Val Tyr Cys Phe Asn Lys Lys Leu
 35 40 45

Tyr Trp Pro Asp Gln Trp Glu Ser Ile Tyr Ser Asn Phe Asn Asp Ile
 50 55 60

Arg Ser Pro Tyr Asn Asp Leu Pro Val Tyr Glu Lys Lys Leu Gly Tyr
 65 70 75 80

Asp Gly Ile Phe Lys Gln Tyr Ala Pro Asp Tyr Lys Lys Asp Ile Ser
 85 90 95

Asp Ile Ala Ser Ala Leu Val Ala Val Leu Ser Asn Gly Tyr Pro Thr

100	105	110
Asn Lys Ser Gln Leu Ser Thr Ser Tyr His Leu Asn Asn Asp Ser Ser 115 120 125		
Arg Lys Val Thr Gln Leu Ala Ile Trp Tyr Phe Ser Asp Ser Leu Thr 130 135 140		
Lys Glu Tyr Leu Lys Asp Thr Gly Gly Tyr Asn Leu Asn Asp Met Glu 145 150 155 160		
Lys Lys Ala Leu Asp Phe Leu Ile Ser Lys Gly Glu Asp Ser Lys Leu 165 170 175		
Lys Ser Glu Gln Ser Asn Tyr Ser Leu Asp Ile Tyr Val Tyr Gln Ser 180 185 190		
Gly Gly His Asp His Met Lys Asp Tyr Gln Asn Leu Leu Gly Ser Thr 195 200 205		
Leu Ile Pro Lys Glu Pro Leu Lys Pro Gln Leu Gly Gly Phe Ser Gly 210 215 220		
His Asn Gly Asn Gly Leu Ser Gly Leu Glu Gly Gly Ser Ser Gly Ser 225 230 235 240		
Gln Glu Thr Asn Glu Asp Gly Lys Lys Gly Leu Ile Gly Phe His Gly 245 250 255		
Gly Leu Ser Gly Ser Glu Gly Lys Arg Asp Pro Leu Pro Gly Leu Lys 260 265 270		
Gly Glu Ala Gly Ala Pro Asp Thr Pro Gln Lys Pro Asn Asp Pro Leu 275 280 285		
Gln Gly Leu Glu Gly Gly Asn Ser Pro Ile Val Glu Gln Asn Tyr Gly 290 295 300		
Ser Thr Glu Gly Tyr Gly 305 310		

<210> 14
<211> 5

<212> PRT
 <213> Streptococcus equi

<400> 14
 Leu Pro Asp Thr Gly
 1 5

<210> 15
 <211> 1971
 <212> DNA
 <213> Streptococcus equi

<400> 15
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 agcctgcaca aggttcgggc aactaatctt agtgacaaca tcacatcatt gacggttgct 120
 tcttcatcac tccgagatgg agagagaacg acggtaaagg ttgcgtttga tgacaaaaaa 180
 cagaaaatca aggcagggga tacgatagag gtcacctggc ctacaagtgg taatgtctac 240
 attcagggct ttaataaaac cataccgctt aatattagag gggtagatgt tggtagcttg 300
 gaggtcacgc tagacaaggc tgttttcaca ttcaatcaaa atattgaaac aatgcatgat 360
 gtctctggtt ggggagagtt tgatattact gttagaaatg tgacacaaac caccgctgaa 420
 acatcaggaa cgaccacagt aaaggtaggc aatcgcaactg ctactatcac tgttactaag 480
 cctgaggcag gcactggtac cagctcattt tattataaga ctggtgatat gcagcccaat 540
 gatactgagc gtgtgagatg gttcctgctg attaacaaca acaaggaatg ggtggccaat 600
 actgttacag tgaagacga tattcaaggt ggtcaaacct tggatatgag cagctttgac 660
 atcaccgtat ctggttatcg taacgagcgc ttcggtgggg aaaacgctct gacagagttt 720
 catacaacat ttccaaattc tgtcattacg gcaacagata atcacattag tgtgcgggta 780
 gatcaatatg atgcctcaca aaacactgtc aacattgctt ataagacaaa gataacggac 840
 ttgaccaaaa aagaatttgc caacaacagt aaaatctggt accagatttt atacaaggat 900
 caggtatcgg gtcaagagtc aaaccaccaa gtagccaata tcaatgctaa cggcgggggtt 960
 gatggcagtc gctataccag ctttactgtc aagaaaattt ggaatgacaa ggaaaatcaa 1020
 gacggtaagc gtccaaagac tattactgtt cagctttacg ccaatgatca gaaagttaat 1080
 gataagacca ttgaattgag tgataactaat agctggcaag caagttttgg taagctggat 1140
 aagtatgaca gtcagaacca aaaaattacc tacagtgtca aggaagtgat ggttcctggt 1200
 ggctaccaat cgcaggttga gggggatagt ggagtaggat ttaccattac caacacctat 1260
 acaccagagg tcattagcat taccggtcaa aaaacttggg acgacagggg aaaccaagac 1320

ggtaaacgtc ctaaggagat tacgggttcgt ttattggcaa atgacgctgc aactgacaag 1380
 gtagcaactg cttcagagca aaccggctgg aagtatacat ttaccaatct accgaaatac 1440
 aaagatggta aacagatcac ctacacgatc caagaggacc ctgtggcaga ttacaccaca 1500
 accattcagg gatttgatat taccaatcat catgaggtag ccttgaccag cctaaaggtc 1560
 atcaaggttt ggaatgataa ggacgattat taccataaac gtcccaagga gattaccatt 1620
 ttgctaaagg cagatggcaa ggtgattcgt gaacatcaga tgacaccgga tcagcaagga 1680
 aaatgggaat acacctttga ccagctgccg gtctatcaga caggcaagaa aatcagctac 1740
 agcattgagg aaaaacagggt tgctggctat caagcccctg tctatgaggt tgatgaaggc 1800
 ttgaagcagg tcaactgtaac caacaccctt aaccaagct acaagctgcc tgacaccgga 1860
 ggacaaggag tgaaatggta cctgttaatc ggtggcggtt ttatcatcgt cgcaatcctt 1920
 gtactgatca gcctttatca aaaacacaag cgccataaca tgtcaaaacc a 1971

<210> 16
 <211> 32
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> OSEC1:5 primer used to PCR-amplify a DNA-fragment corresponding to a
 sequence from amino acid no. 27 to amino acid no. 615 in protein SEC
 (SEQ. ID. NO: 4)

<400> 16
 catgccatgg caactaatct tagtgacaac at 32

<210> 17
 <211> 32
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> OSEC3:3 primer used to PCR-amplify a DNA-fragment corresponding to a
 sequence from amino acid no. 27 to amino acid no. 615 in protein SEC
 (SEQ. ID. NO: 4)

<400> 17
 ccgctcgagc ttgtagcttg ggtaagggt gt 32

<210> 18
 <211> 32
 <212> DNA
 <213> Artificial Sequence

<220>

<223> OSEC2:3 primer used to PCR-amplify a DNA-fragment corresponding to a sequence from amino acid no. 27 to amino acid no. 328 in protein SEC (SEQ. ID. NO: 4)

<400> 18

ccgctcgaga aagctggtat agcgactgcc at

32

<210> 19

<211> 1782

<212> DNA

<213> Streptococcus equi

<400> 19

atggcaacta atcttagtga caacatcaca tcattgacgg ttgcttcttc atcactccga	60
gatggagaga gaacgacggg aaagggttgcg tttgatgaca aaaaacagaa aatcaaggca	120
ggggatacga tagaggtcac ctggcctaca agtggtaatg tctacattca gggctttaat	180
aaaaccatac cgcttaatat tagaggggta gatgttggtta ccttggaggt cacgctagac	240
aaggctgttt tcacattcaa tcaaaatatt gaaacaatgc atgatgtctc tggttgggga	300
gagtttgata ttactgttag aaatgtgaca caaaccaccg ctgaaacatc aggaacgacc	360
acagtaaagg taggcaatcg cactgctact atcactgtta ctaagcctga ggcaggcact	420
ggtaccagct cattttatta taagactggt gatattcagc ccaatgatac tgagcgtgtg	480
agatggttcc tgctgattaa caacaacaag gaatgggtgg ccaatactgt tacagtcgaa	540
gacgatattc aagggtggtca aaccttggat atgagcagct ttgacatcac cgtatctggt	600
tatcgtaacg agcgcttcgt tggggaaaac gctctgacag agtttcatac aacatttcca	660
aatttctgtca ttacggcaac agataatcac attagtgtgc ggttagatca atatgatgcc	720
tcacaaaaca ctgtcaacat tgcttataag acaaagataa cggactttga ccaaaaagaa	780
tttgccaaca acagtaaaat ctggtaccag attttataca aggatcaggt atcgggtcaa	840
gagtcaaacc accaagtagc caatatcaat gctaacggcg gggttgatgg cagtcgctat	900
accagcttta ctgtcaagaa aatttggaat gacaaggaaa atcaagacgg taagcgtcca	960
aagactatta ctgttcagct ttacgccaat gatcagaaag ttaatgataa gaccattgaa	1020
ttgagtgata ctaatagctg gcaagcaagt tttggtaagc tggataagta tgacagtcag	1080
aaccaaaaaa ttacctacag tgtcaaggaa gtgatgggtc ctgttggtta ccaatcgtag	1140
gttgaggggg atagtggagt aggatttacc attaccaaca cctatacacc agaggtcatt	1200
agcattaccg gtcaaaaaac ttgggacgac agggaaaacc aagacggtaa acgtcctaag	1260

gagattacgg ttcgtttatt ggcaaatgac gctgcaactg acaaggtagc aactgcttca 1320
gagcaaaccg gctggaagta tacatttacc aatctaccga aatacaaaga tggtaaacag 1380
atcacctaca cgatccaaga ggaccctgtg gcagattaca ccacaaccat tcagggattt 1440
gatattacca atcatcatga ggtagccttg accagcctaa aggtcatcaa ggtttggat 1500
gataaggacg attattacca taaacgtccc aaggagatta ccattttgct aaaggcagat 1560
ggcaagggtga ttcgtgaaca tcagatgaca ccggatcagc aaggaaaatg ggaatacacc 1620
tttgaccagc tgccggtcta tcaggcaggc aagaaaatca gctacagcat tgaggaaaaa 1680
caggttgctg gctatcaagc ccctgtctat gaggttgatg aaggcttgaa gcaggtcact 1740
gtaaccaaca cccttaaccc aagctacaag ctcgagcccg gg 1782

<210> 20
<211> 594
<212> PRT
<213> Streptococcus equi

<400> 20

Met Ala Thr Asn Leu Ser Asp Asn Ile Thr Ser Leu Thr Val Ala Ser
1 5 10 15

Ser Ser Leu Arg Asp Gly Glu Arg Thr Thr Val Lys Val Ala Phe Asp
20 25 30

Asp Lys Lys Gln Lys Ile Lys Ala Gly Asp Thr Ile Glu Val Thr Trp
35 40 45

Pro Thr Ser Gly Asn Val Tyr Ile Gln Gly Phe Asn Lys Thr Ile Pro
50 55 60

Leu Asn Ile Arg Gly Val Asp Val Gly Thr Leu Glu Val Thr Leu Asp
65 70 75 80

Lys Ala Val Phe Thr Phe Asn Gln Asn Ile Glu Thr Met His Asp Val
85 90 95

Ser Gly Trp Gly Glu Phe Asp Ile Thr Val Arg Asn Val Thr Gln Thr
100 105 110

Thr Ala Glu Thr Ser Gly Thr Thr Thr Val Lys Val Gly Asn Arg Thr
115 120 125

Ala Thr Ile Thr Val Thr Lys Pro Glu Ala Gly Thr Gly Thr Ser Ser
 130 135 140

Phe Tyr Tyr Lys Thr Gly Asp Ile Gln Pro Asn Asp Thr Glu Arg Val
 145 150 155 160

Arg Trp Phe Leu Leu Ile Asn Asn Asn Lys Glu Trp Val Ala Asn Thr
 165 170 175

Val Thr Val Glu Asp Asp Ile Gln Gly Gly Gln Thr Leu Asp Met Ser
 180 185 190

Ser Phe Asp Ile Thr Val Ser Gly Tyr Arg Asn Glu Arg Phe Val Gly
 195 200 205

Glu Asn Ala Leu Thr Glu Phe His Thr Thr Phe Pro Asn Ser Val Ile
 210 215 220

Thr Ala Thr Asp Asn His Ile Ser Val Arg Leu Asp Gln Tyr Asp Ala
 225 230 235 240

Ser Gln Asn Thr Val Asn Ile Ala Tyr Lys Thr Lys Ile Thr Asp Phe
 245 250 255

Asp Gln Lys Glu Phe Ala Asn Asn Ser Lys Ile Trp Tyr Gln Ile Leu
 260 265 270

Tyr Lys Asp Gln Val Ser Gly Gln Glu Ser Asn His Gln Val Ala Asn
 275 280 285

Ile Asn Ala Asn Gly Gly Val Asp Gly Ser Arg Tyr Thr Ser Phe Thr
 290 295 300

Val Lys Lys Ile Trp Asn Asp Lys Glu Asn Gln Asp Gly Lys Arg Pro
 305 310 315 320

Lys Thr Ile Thr Val Gln Leu Tyr Ala Asn Asp Gln Lys Val Asn Asp
 325 330 335

Lys Thr Ile Glu Leu Ser Asp Thr Asn Ser Trp Gln Ala Ser Phe Gly
 340 345 350

Lys Leu Asp Lys Tyr Asp Ser Gln Asn Gln Lys Ile Thr Tyr Ser Val
 355 360 365

Lys Glu Val Met Val Pro Val Gly Tyr Gln Ser Gln Val Glu Gly Asp
 370 375 380

Ser Gly Val Gly Phe Thr Ile Thr Asn Thr Tyr Thr Pro Glu Val Ile
 385 390 395 400

Ser Ile Thr Gly Gln Lys Thr Trp Asp Asp Arg Glu Asn Gln Asp Gly
 405 410 415

Lys Arg Pro Lys Glu Ile Thr Val Arg Leu Leu Ala Asn Asp Ala Ala
 420 425 430

Thr Asp Lys Val Ala Thr Ala Ser Glu Gln Thr Gly Trp Lys Tyr Thr
 435 440 445

Phe Thr Asn Leu Pro Lys Tyr Lys Asp Gly Lys Gln Ile Thr Tyr Thr
 450 455 460

Ile Gln Glu Asp Pro Val Ala Asp Tyr Thr Thr Thr Ile Gln Gly Phe
 465 470 475 480

Asp Ile Thr Asn His His Glu Val Ala Leu Thr Ser Leu Lys Val Ile
 485 490 495

Lys Val Trp Asn Asp Lys Asp Asp Tyr Tyr His Lys Arg Pro Lys Glu
 500 505 510

Ile Thr Ile Leu Leu Lys Ala Asp Gly Lys Val Ile Arg Glu His Gln
 515 520 525

Met Thr Pro Asp Gln Gln Gly Lys Trp Glu Tyr Thr Phe Asp Gln Leu
 530 535 540

Pro Val Tyr Gln Ala Gly Lys Lys Ile Ser Tyr Ser Ile Glu Glu Lys
 545 550 555 560

Gln Val Ala Gly Tyr Gln Ala Pro Val Tyr Glu Val Asp Glu Gly Leu
 565 570 575

Lys Gln Val Thr Val Thr Asn Thr Leu Asn Pro Ser Tyr Lys Leu Glu

580

585

590

Pro Gly

<210> 21
 <211> 921
 <212> DNA
 <213> Streptococcus equi

<400> 21
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 gatggagaga gaacgacggt aaagggtgcg tttgatgaca aaaaacagaa aatcaaggca 120
 ggggatacga tagaggtcac ctggcctaca agtggtaatg tctacattca gggctttaat 180
 aaaaccatac cgcttaatat tagaggggta gatgttggtta ccttggagggt cacgctagac 240
 aaggctgttt tcacattcaa tcaaaatatt gaaacaatgc atgatgtctc tggttgggga 300
 gagtttgata ttactgttag aaatgtgaca caaaccaccg ctgaaacatc aggaacgacc 360
 acagtaaagg taggcaatcg cactgctact atcactgtta ctaagcctga ggcaggcact 420
 ggtaccagct cattttatta taagactggt gatatgcagc ccaatgatac tgagcgtgtg 480
 agatgggttcc tgctgattaa caacaacaag gaatgggtgg ccaatactgt tacagtcgaa 540
 gacgatattc aagggtggtca aacottggat atgagcagct ttgacatcac cgtatctggt 600
 tatcgtaacg agcgcttcgt tggggaaaac gctctgacag agtttcatac aacatttcca 660
 aattctgtca ttacggcaac agataatcac attagtgtgc ggtagatca atatgatgcc 720
 tcacaaaaca ctgtcaacat tgcttataag acaaagataa cggactttga ccaaaaagaa 780
 tttgccaaaca acagtaaaat ctggtaccag attttataca aggatcaggt atcgggtcaa 840
 gagtcaaacc accaagtagc caatatcaat gctaacggcg gggttgatgg cagtcgctat 900
 accagctttc tcgagcccgg g 921

<210> 22
 <211> 307
 <212> PRT
 <213> Streptococcus equi

<400> 22

Met Ala Thr Asn Leu Ser Asp Asn Ile Thr Ser Leu Thr Val Ala Ser
 1 5 10 15

Ser Ser Leu Arg Asp Gly Glu Arg Thr Thr Val Lys Val Ala Phe Asp
20 25 30

Asp Lys Lys Gln Lys Ile Lys Ala Gly Asp Thr Ile Glu Val Thr Trp
35 40 45

Pro Thr Ser Gly Asn Val Tyr Ile Gln Gly Phe Asn Lys Thr Ile Pro
50 55 60

Leu Asn Ile Arg Gly Val Asp Val Gly Thr Leu Glu Val Thr Leu Asp
65 70 75 80

Lys Ala Val Phe Thr Phe Asn Gln Asn Ile Glu Thr Met His Asp Val
85 90 95

Ser Gly Trp Gly Glu Phe Asp Ile Thr Val Arg Asn Val Thr Gln Thr
100 105 110

Thr Ala Glu Thr Ser Gly Thr Thr Thr Val Lys Val Gly Asn Arg Thr
115 120 125

Ala Thr Ile Thr Val Thr Lys Pro Glu Ala Gly Thr Gly Thr Ser Ser
130 135 140

Phe Tyr Tyr Lys Thr Gly Asp Met Gln Pro Asn Asp Thr Glu Arg Val
145 150 155 160

Arg Trp Phe Leu Leu Ile Asn Asn Asn Lys Glu Trp Val Ala Asn Thr
165 170 175

Val Thr Val Glu Asp Asp Ile Gln Gly Gly Gln Thr Leu Asp Met Ser
180 185 190

Ser Phe Asp Ile Thr Val Ser Gly Tyr Arg Asn Glu Arg Phe Val Gly
195 200 205

Glu Asn Ala Leu Thr Glu Phe His Thr Thr Phe Pro Asn Ser Val Ile
210 215 220

Thr Ala Thr Asp Asn His Ile Ser Val Arg Leu Asp Gln Tyr Asp Ala
225 230 235 240

Ser Gln Asn Thr Val Asn Ile Ala Tyr Lys Thr Lys Ile Thr Asp Phe

245	250	255
Asp Gln Lys Glu Phe Ala Asn Asn Ser Lys Ile Trp Tyr Gln Ile Leu		
260	265	270
Tyr Lys Asp Gln Val Ser Gly Gln Glu Ser Asn His Gln Val Ala Asn		
275	280	285
Ile Asn Ala Asn Gly Gly Val Asp Gly Ser Arg Tyr Thr Ser Phe Leu		
290	295	300
Glu Pro Gly		
305		
<210> 23		
<211> 302		
<212> PRT		
<213> Streptococcus equi		
<400> 23		
Met Thr Asn Lys Thr Lys Arg Thr Gly Leu Val Arg Lys Tyr Gly Ala		
1	5	10
		15
Cys Ser Ala Ala Ile Ala Leu Ala Ala Leu Ala Ser Leu Gly Ala Gly		
20	25	30
Lys Ala Val Lys Ala Asp Gln Pro Ala Ala Leu Lys Tyr Pro Glu Pro		
35	40	45
Arg Asp Tyr Phe Leu His Thr Arg Glu Gly Asp Val Ile Tyr Asp Glu		
50	55	60
Asp Ile Lys Arg Tyr Phe Glu Asp Leu Glu Ala Tyr Leu Thr Ala Arg		
65	70	75
		80
Leu Gly Gly Ile Asp Lys Lys Val Glu Glu Ala Ala Gln Lys Pro Gly		
85	90	95
Ile Pro Gly Pro Thr Gly Pro Gln Gly Pro Lys Gly Asp Lys Gly Asp		
100	105	110
Pro Gly Ala Pro Gly Glu Arg Gly Pro Ala Gly Pro Lys Gly Asp Thr		
115	120	125

Gly Glu Ala Gly Pro Arg Gly Glu Gln Gly Pro Ala Gly Gln Ala Gly
 130 135 140

Glu Arg Gly Pro Lys Gly Asp Pro Gly Ala Pro Gly Pro Lys Gly Glu
 145 150 155 160

Lys Gly Asp Thr Gly Ala Val Gly Pro Lys Gly Glu Lys Gly Asp Thr
 165 170 175

Gly Ala Thr Gly Pro Lys Gly Asp Lys Gly Glu Arg Gly Glu Lys Gly
 180 185 190

Glu Gln Gly Gln Arg Gly Glu Lys Gly Glu Gln Gly Gln Arg Gly Glu
 195 200 205

Lys Gly Glu Gln Lys Pro Lys Gly Asp Gln Gly Lys Asp Thr Lys Pro
 210 215 220

Ser Ala Pro Lys Ala Pro Glu Lys Ala Pro Ala Pro Lys Ala Pro Lys
 225 230 235 240

Ala Ser Glu Gln Ser Ser Asn Pro Lys Ala Pro Ala Pro Lys Ser Ala
 245 250 255

Pro Ser Lys Ser Ala Ala Pro Thr Gly Gln Lys Ala Ala Leu Pro Ala
 260 265 270

Thr Gly Glu Ile Asn His Pro Phe Phe Thr Leu Ala Ala Leu Ser Val
 275 280 285

Ile Ala Ser Val Gly Val Leu Thr Leu Lys Gly Lys Lys Asp
 290 295 300

<210> 24
 <211> 909
 <212> DNA
 <213> Streptococcus equi

<400> 24
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 gcagcactaa aatatccaga acctagagac tattttcttc atactcgtga aggtgatgtt 180

atttatgatg aggatataaa aagatatattt gaggatttag aagcctattt aacagctaga 240
 cttagtgaggga ttgataaaaa agtagaagaa gctgccccaa agccagggtat tccaggctct 300
 actggccctc aaggctcctaa gggagacaaa ggagatccag gtgcccctgg tgagcgcggt 360
 ccagctggac caaagggcga tacgggcgaa gccggacca gaggtgagca aggccagcc 420
 ggacaagctg gagaacgtgg accaaaagga gatccagggtg ctccagggtcc taaagggtgaa 480
 aagggtgata ctggtgcagt tggctcctaaa ggtgaaaaag gtgataccgg agcaaccgga 540
 ccaaggggag acaagggcga acgcggtgaa aaaggcgagc aaggccaacg tggcgaaaaa 600
 ggcgagcaag gccaacgcgg tgaaaaaggc gagcaaaaac caaaggggtga tcaaggaaaa 660
 gatacaaaac catcagctcc aaaagcacct gaaaaggctc ctgcaccaa agctccaaag 720
 gcttcagagc agtcacttaa tcctaaagca ccagctccta agtcagcacc aagcaaata 780
 gcggcaccaa cagggtcaaaa agcagcccta ccagcaacag gggaaatcaa ccacccattc 840
 ttcacccttg cagctcttag tgtcatcgct agcgtaggcg tcctaactct aaaaggaaaa 900
 aaagactaa 909

<210> 25
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> OSCL2:5 primer used to PCR-amplify a DNA-fragment corresponding to amino acid 38 to amino acid 269 in protein SclC

<400> 25
 catgccatgg accagccagc agcactaaaa tat 33

<210> 26
 <211> 31
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> OSCL3:3 primer used to PCR-amplify a DNA-fragment corresponding to amino acid 38 to amino acid 269 in protein SclC

<400> 26
 ccgctcgagg gctgcttttt gacctgttgg t 31

<210> 27
 <211> 237
 <212> PRT
 <213> Streptococcus equi

<400> 27

Met Asp Gln Pro Ala Ala Leu Lys Tyr Pro Glu Pro Arg Asp Tyr Phe
1 5 10 15

Leu His Thr Arg Glu Gly Asp Val Ile Tyr Asp Glu Asp Ile Lys Arg
20 25 30

Tyr Phe Glu Asp Leu Glu Ala Tyr Leu Thr Ala Arg Leu Gly Gly Ile
35 40 45

Asp Lys Lys Val Glu Glu Ala Ala Gln Lys Pro Gly Ile Pro Gly Pro
50 55 60

Thr Gly Pro Gln Gly Pro Lys Gly Asp Lys Gly Asp Pro Gly Ala Pro
65 70 75 80

Gly Glu Arg Gly Pro Ala Gly Pro Lys Gly Asp Thr Gly Glu Ala Gly
85 90 95

Pro Arg Gly Glu Gln Gly Pro Ala Gly Gln Ala Gly Glu Arg Gly Pro
100 105 110

Lys Gly Asp Pro Gly Ala Pro Gly Pro Lys Gly Glu Lys Gly Asp Thr
115 120 125

Gly Ala Val Gly Pro Lys Gly Glu Lys Gly Asp Thr Gly Ala Thr Gly
130 135 140

Pro Lys Gly Asp Lys Gly Glu Arg Gly Glu Lys Gly Glu Gln Gly Gln
145 150 155 160

Arg Gly Glu Lys Gly Glu Gln Gly Gln Arg Gly Glu Lys Gly Glu Gln
165 170 175

Lys Pro Lys Gly Asp Gln Gly Lys Asp Thr Lys Pro Ser Ala Pro Lys
180 185 190

Ala Pro Glu Lys Ala Pro Ala Pro Lys Ala Pro Lys Ala Ser Glu Gln
195 200 205

Ser Ser Asn Pro Lys Ala Pro Ala Pro Lys Ser Ala Pro Ser Lys Ser
210 215 220

Ala Ala Pro Thr Gly Gln Lys Ala Ala Leu Glu Pro Gly
225 230 235

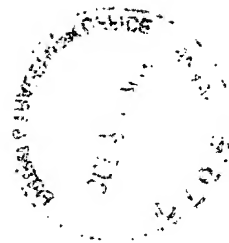
<210> 28
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Motif corresponding to the LPDTG motif (SEQ. ID. NO: 14) of the SEC
protein

<220>
<221> misc_feature
<222> (3)..(3)
<223> Xaa can be any naturally occurring amino acid

<400> 28

Leu Pro Xaa Thr Gly
1 5



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